TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

July 29, 2008

TO: Internal File

THRU: Priscilla Burton, Team Lead PMB 10/22/08

FROM: James D. Smith, Environmental Scientist III JDS 10/22/08

SUBJECT: Permit Application - Coal Hollow Project, Alton Coal Development, Coal Hollow Mine, C/025/0005, Task ID # 2910

SUMMARY:

This is a new permit application. The application was first received 24 January, 2008. The Division has determined the application to be Administratively Complete (letter dated 14 March, 2008).

TECHNICAL ANALYSIS:

GENERAL CONTENTS

PUBLIC NOTICE AND COMMENT

Regulatory References: 30 CFR 778.21; 30 CFR 773.13; R645-300-120; R645-301-117.200.

Analysis:

The application contains a Proof of Publication (Proposed); the ACR for this submittal was completed on March 14, 2008, and public notification by publication in a local newspaper should have followed. A copy of the actual Proof of Publication needs to be included in the Application.

Findings

R645-300-121.100 An affidavit of publication needs to be included in the Application.

PERMIT APPLICATION FORMAT AND CONTENTS

Regulatory Reference: 30 CFR 777.11; R645-301-120.

Analysis:

The application is very repetitive, much of it being simply restatements of previous assertions, without supporting data or arguments. Data and other information should be presented and discussed and analyzed in appropriate locations, and then other sections could reference those sections rather than simply reasserting generalizations. The document is replete with assertions and statements not backed by - or at least not clearly linked to - information, data, and analysis.

Findings:

R6450301-121.200, The Applicant needs to present data and information that supports all conclusions and assertions in a clear and concise manner. Data and other information can be presented and discussed and analyzed in appropriate locations, and then other sections referenced to those sections, rather than repeatedly presenting broad assertions and generalizations. Specific examples are identified in sections of this Tech Memo that follow.

MAPS AND PLANS

Regulatory Reference: 30 CFR 777.14; R645-301-140.

Analysis:

On the copy of the BLM land-ownership map (dated November 30, 2006 and located at the end of Chapter 1, Appendix 1-3, Exhibit 3), the color-coded explanation does not indicate which colors represent National Forest, Private, and National Park lands.

Findings

R645-301-121.200 The Applicant must include on the land-ownership map (dated November 30, 2006 and located at the end of Chapter 1, Appendix 1-3, Exhibit 3) the color-key for National Forest, Private, and National Park lands.

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

CLIMATOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.18; R645-301-724.

Analysis:

The application discusses the climatological factors representative of the proposed permit area in Section 724.400 and Appendix 7-1. Table 7-3 summarizes climatological information from the Alton weather station located approximately 2 miles north of the proposed mine: data were collected from 1928 to 2005. Drawing 7-8A presents the data graphically. The Applicant installed an automated weather station at the proposed mine site in December 2005. The station continuously measures and records temperature, wind velocity and direction, and precipitation, although the rain gauge is not operative in the winter. Drawing 7-8B plots daily maximum and minimum temperatures at the Coal Hollow Mine site for from January 2006 to May 2007. Appendix 7-6 contains climatological data for both the Alton and Coal Hollow weather stations. Speed and direction of prevailing winds at the proposed mine site are shown on rose diagrams in Figure 4 of Appendix 7-1.

Findings:

Climatological Resource Information in the application is adequate to meet the requirements of the Coal Mining Rules.

ALLUVIAL VALLEY FLOORS

Regulatory Reference: 30 CFR 785.19; 30 CFR 822; R645-302-320.

Analysis:

Alluvial Valley Floor Determination

Drawing 7-7 identifies flood irrigated and subirrigated lands, ditches that have been used for irrigation, and ponds that were probably part of irrigation systems. In Section 728.334, the Applicant states that there has been no irrigation during the past 10 years; the basis for this statement is not cited.

Stockwatering is the use stated on most of the water right printouts in Appendix 7-3, but most spring and surface-diversion rights in the W/2 of Sec. 29, E/2 of Sec 30, and W/2 of Sec. 32, T. 39 S., R. 5 W., along Sink Valley Wash around and downstream of the Swapp Ranch, either cover both stockwatering and irrigation or are for irrigation only.

During a visit to Sink Valley Wash on 5-7 September, 2006 and at other times, Division personnel have seen no evidence of current or recent flood irrigation in Sink Valley Wash. During the September on-site visit, Mr. C. Burton Pugh told Division personnel that his family had used irrigation to raise potatoes and two small orchards on their property just west of the Swapp Ranch: Mr. Pugh's father won a USDA prize for the highest yield of potatoes per acre (700 bushels per acre) in 1917, and oats and wheat were raised in the 1950's. The Pughs used ditches, ponds, and pipes to irrigate, bringing water from as far as upper Robinson Creek: Plate 7-7 shows locations for some of these structures.

The Applicant has made a request for determination of alluvial valley floor for the proposed Coal Hollow Mine and Sink Valley Wash area. Chapter 7 of the application contains an unnumbered appendix titled Alluvial Valley Floor Supplemental Information, which was added to specifically address several questions raised by the Division during the Administrative Completeness review.

1. Coalesced alluvial fans form the surface of Sink Hollow Wash.
2. Flood plains and terraces are characteristic of alluvial valley floors
    a. The Applicant has found no evidence of these features.
    b. The cross section across the fan is convex, not planar.

c. There are no vestiges of former flood plains, i.e., terraces.

3. There is no continuous stream channel in Sink Valley Wash
   a. There is evidence for a continuous channel
      i. The USGS Alton Topographic Quad shows a continuous channel for Sink Valley Wash.
      ii. The water rights map, Drawing 7-7, indicates continuous point-to–point diversions along the length of the Sink Valley Wash channel.
   b. The Applicant's field investigation indicates the main Sink Valley Wash channel is not continuous.
   c. The Applicant's study of aerial photos indicates numerous discontinuous channel sections along Sink Valley Wash, but no continuous channel
      i. This is due to deposition across the channel-way by mud flows, sheet floods, and debris flow
      ii. Human activity may have created some of the discontinuity.
   d. Adjacent to Sink Valley Wash, Kanab Creek and its tributaries are downcutting.
      i. Robinson Creek is the only continuous channel in the Sink Valley Wash area
      ii. Robinson Creek is deeply incised and appears to be actively downcutting.
   e. The Applicant observed sheet flow from snowmelt in March of 2006
      i. Waters in the fields upstream of SW-6 were not flowing through any discernable stream drainage.
      ii. Surface flow was over a large area in an unconcentrated sheet flood.
4. Alluvial ground water is present.
   a. Water is both confined and unconfined
   b. There is no single, simple mappable water table or potentiometric surface, so cross sections and maps are not extrapolated over any distance (the Division has written a deficiency related to this).
5. Two small areas of subirrigated pasture are identified on Drawing 7-7
   a. Both of these regions are located east of the north-south trending Tropic Shale bedrock ridge that bisects the Coal Hollow Project area into eastern and western regions.
      i. Water quality in the northern subirrigation area is suitable for certain irrigation uses.
         1. Salinity hazard is medium to high with low sodium danger.
         2. It is suitable for irrigation of all or most plants, including boron-sensitive species.
            a. Special management for salinity control and drainage may be required.
            b. Plants with good salt tolerance should be selected.
      ii. Water quality in the southern area indicates high to very high salinity hazard with a low sodium danger.

1. The water is suitable for all salinity- and boron-tolerant species and many semi-tolerant species.
2. Good drainage and salinity control may be required.

iii. TDS is generally high in alluvial waters west of these subirrigated areas.

b. Water quality in the seeps in the southern end of Sink Valley Wash, near the southern subirrigation area, indicate ground water potentially available for subirrigation is of poor quality, high-salinity waters not typically useful for crop irrigation.
c. The Applicant noted no specific correlation between seasonal variations of water levels and vegetation changes.
d. Other potential subirrigated areas are on Drawing 3-1.
e. Root size and density and soil mottling were used to evaluate subirrigation potential for the various plant communities.
   i. Only the meadow and dry meadow plant communities were found to exhibit characteristics of sub-irrigation in the major soil types.
   ii. Pasture land has the potential for subirrigation.
   iii. Soil map unit 7 (Drawing 2-1) has characteristics of subirrigation; units 6 and 13 have localized potential for subirrigation, depending on soil type.

6. Historic flood irrigated and subirrigated lands are shown on Drawing 7-7
   a. The Pugh and Swapp Ranch homesteads used flood irrigation in the past.
   b. Darlynn Sorensen currently uses flood irrigation for hay or grain production on his property at the south end of Sink Hollow Wash.
      i. Irrigation typically was a single application in the spring, when adequate water was available.
      ii. With the exception of 2005, water has not been sufficient for flood irrigation in recent years.
      iii. Without irrigation, there is still a crop but yield is lower.
   c. There is not now and has never been a reliable source of water for flood irrigation.
   d. Ponds are used for stockwatering and were used in the irrigation systems in the past.
      i. There are no operable conveyance systems between the ponds.
      ii. Drawing 7-7 shows the unlined earthen ditches used in the past to connect the ponds.
      iii. Although alluvial fans are stream laid, they lack flood plains and terraces typically associated with alluvial valley floors.
   e. Pasture lands in Sink Hollow Wash rely on precipitation (average approximately 16 in/yr) and not irrigation or subirrigation.
7. Swapp Hollow Creek has the best potential to support flood irrigation.
   a. Average instantaneous discharge measured is 55 gpm.
      i. There is considerable seasonal and climatic variability.
      ii. .Calculated annual yield is 88.7 acre-feet, which would irrigate approximately 24 acres of alfalfa.

   b. Swap Hollow water is medium salinity, with low sodium hazard, suitable for most plants
8. Lower Robinson Creek, Dry Canyon, Section 21 drainage, Upper Water Canyon spring diversion, Sink Valley Wash, and alluvial ground water discharges have less potential to support flood irrigation.
   a. Flow volumes are low and inconsistent
   b. Water Canyon spring has good quality, water quality of the other potential sources is not discussed, mainly because analyses are sparse due to no-flow conditions.

Topography is compatible to flood irrigation. J. C. Schmidt (*1980. Reconnaissance Determination of Alluvial Valley Floor Status and Assessment of Selected Geomorphic Parameters in Selected Stream Valleys of the Alton Petition Area and Adjoining Lands, Garfield and Kane counties, Utah. Report prepared for Office of Surface Mining)* made a reconnaissance determination

> "...intended to distinguish those areas clearly not alluvial valley floors and those areas where detailed study might show that the areas would be formally designated as alluvial valley floor. Reconnaissance identification is thus intended to highlight those areas where detailed study is necessary." (p. 43).

Schmidt based his determination on aerial photos, USGS reports, USDA farm maps, conversations with farmers and US Soil Conservation Service, water rights filings, and field reconnaissance. Schmidt incorporated these findings into OSM's draft "Alluvial Valley Floor Identification and Study Guidelines", in particular into Appendix D, which is specific to the Alton area. UDOGM made a determination in its 1988 Initial Completeness Determination that the Sink Valley Wash was an AVF based on Schmidt's reconnaissance and generalized statements.

However, Water & Engineering Technology, Inc (WET, Appendix 7-4) and Petersen Hydrologic (Appendix 7-1 and Supplement) have done more detailed studies of Sink Valley Wash and have determined it is not an AVF. These reports find that although Sink Valley Wash is an alluvial deposit, it is an alluvial fan and lacks a floodplain and terrace complex necessary for an AVF. Also, the channel does not appear to be continuous. There was some question that the discontinuity of the channels was the result of human activities, but WET discusses evidence that the channel interruptions are natural, the result of deposition of colluvial and alluvial sediments from adjacent slopes and tributary drainages.

The Division has likewise found that although some characteristics for an AVF are present, not all characteristics listed in the definitions in the Coal Mining Rules are present (see definitions for both "Alluvial Valley Floor" and "Upland Areas"). The Division intends further investigation of whether or not there is channel continuity. Upper Sink Valley Wash, where the

mine is proposed, has no floodplain and terrace complex. In light of the finding the Division must make based on R645-302-321.300, it is not clear that the absence of a floodplain and terrace complex and continuous stream channel are sufficient to find that upper Sink Valley Wash is not an AVF.

1. The surface in upper Sink Valley Wash consists of unconsolidated steam-laid deposits of coalesced alluvial fans.
2. Topography is compatible for flood irrigation.
3. There are neither flood plains nor terraces.
4. Surface drainage channels do not appear to be continuous.
5. There is currently no flood irrigation in the area.
    a. There has been flood irrigation in the past, but no longer.
        i. Water is not consistently available for flood irrigation
        ii. Most water quality is marginal to unsatisfactory for flood irrigation.
    b. The change in land use (cessation of irrigation) was neither affected by nor precluded in any way by the proposed mine or the applicant.
6. Using salinity control and appropriate plant selection, the ground-water systems have the potential to support subirrigation in two small areas.

There is evidence of AVF in lower Sink Valley Wash and along Kanab Creek, areas adjacent to the proposed mine. The Division is requiring the Applicant to provide additional information and discussion for these areas, so that the Division can make the determination as to whether or not the proposed mine will prevent or interrupt ongoing farming activities in the adjacent areas that are irrigated or subirrigated.

Findings:

Information in the submittal is sufficient for the Division to determine that, although some characteristics for an alluvial valley floor are present, not all necessary characteristics are present and there is no AVF in upper Sink Valley Wash where the proposed mine is to be located.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Sampling and Analysis

The Applicant states that water sampling and analysis have been and will be conducted according to the methodology in the current edition of "Standard Methods for the Examination of Water and Wastewater" or the methodology in 40 CFR Parts 136 and 434 (Section 723).

Baseline Information

Petersen Hydrologic conducted a spring and seep survey in 2005 and 2006. UTM coordinates and basic parameters are listed in Appendix B of Appendix 7-1. Locations are plotted on a USGS topographic base map in that same appendix: the area covered by the survey is not identified.

Drawing 7-1 shows streams and springs in and adjacent to the Coal Hollow Mine permit area. Drawing 7-7 shows locations for a number of small ponds created to impound runoff and spring discharge for stockwatering and irrigation, and conveyance ditches. The drawing base, a USGS topographic quadrangle, shows numerous small ponds that generally coincide with the ponds marked by the Applicant, although the Applicant has apparently identified ponds not shown on the topographic base. Section 722.200 states there are no significant natural ponds or lakes.

Drawing 7-2 and 7-12 show locations of stations used for baseline monitoring; 7-12 also identifies locations of wells used to monitor ground water in previous studies. These previous studies include a number of published studies that are referenced in the Application and data from an earlier permit application by Utah International, Inc. Relevant Utah International data have been included as part of the baseline information. The Applicant began its own baseline monitoring program of streams, wells, seeps, and springs in the 2nd Qtr 2005 and the data have been submitted to the Division's electronic database. Data collected up to March 2007 are listed in Table 4 in the submittal: the Division's database has data through the 1st Qtr 2008

The narrative indicates the bore holes on Drawing 7-2 are not monitoring wells, and the Legend on that drawing does not identify them as monitoring wells. The narrative implies only some – or perhaps none – of the bore holes and wells shown on Drawings 7-2 and 7-12 were used to provide baseline for the submittal. Table 7-1 lists monitoring station details such as location and elevation, but Table 7-2 also contains monitoring well details – the distinction between the information on these tables is unclear. Section 722.400 states water well locations are on Drawings 7-2 and 7-12, but there is no way to distinguish them from the other wells and boreholes.

Drawing 5-1 shows the existing land surface configuration, and 5-35 shows the post-mining configuration for the proposed permit area. The contour interval is 2 feet. Configuration of the adjacent area is shown on several maps, such as 7-2, but the contour interval is 40 feet.

Water rights are shown on Drawing 7-7. Printouts from the Division of Water Rights are in Appendix 7-3. Identifying labels on Drawing 7-7 correspond to reference numbers the Applicant has placed in the upper right corner of the water rights printouts in the appendix. The appendix is divided into Exhibit 7-1 –Stream Reaches, Exhibit 7-2 – Surface Diversions, and Exhibit 7-3 – Springs (respectively SR, SD, and SP on Drawing 7-3).

The Applicant has submitted water quality and quantity baseline data electronically to the Division's database. Data from previous studies have been incorporated into the baseline data and hydrologic analysis in the permit application; the older data are tabulated in Appendix 7-1.

The Division received a comment that baseline water quality and quantity data were not sufficient, that one or more season's data were missing for some sites, and that data have not been collected for two years. The Division's Tech-004 is cited: Tech -004 is a guideline, not a rule, and is not enforceable. Tech-004 advises one year of baseline data, adequate to describe seasonal variation, before the submission of the application.

The Applicant describes 11 surface-water baseline monitoring points in Section 724.200. The following summarizes what is in the Division's electronic database for these sites: Table 4 of Appendix 7-1 also contains discharge and water quality data for these sites and discharges are plotted in Figure 13 of Appendix 7-1. Although data are missing for some quarters at certain sites, the data are sufficient to determine seasonal variation in quality and quantity, and data collection is ongoing.

F - field parameters only; **B** - baseline parameters; **NA** - no access

Qtr.	SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-8	SW-9	SW-101	RID-1
1-87											
2-87		F									
3-87	F	F	F			F	F	F			
4-87	F	F	F	F	F	F	F	F	F		
1-88	F	F	F	F	F	F	F	F	F		
2-05		B	B		B			B	B	B	
3-05		B	B		B	B		B	B	B	
4-05		B	B				B	B	B	B	B
1-06	B	B	B			B			B	B	
2-06	B	B	B	B	B	B		B	B	B	B
3-06	B	B	B	B	B	B	B	B			
4-06	B		B	B	B	B	B	B		B	B

1-07	B	B	B	B	B	B	B	B	B		B
2-07				B	B	B	B		B	B	
3-07	B	B		B		B	B	B	B	B	B
4-07	B	NA	B	B	B	B	B	B	B	B	B
1-08		NA	B	NA	B	B		NA	B	B	NA
2-08											

Several boreholes encountered water at depths of approximately 10 – 15 feet, and flowing sands were found at 15 to 25 feet. The subsurface investigation was done during a period of high snowmelt; seasonal fluctuations of water levels of several feet are not uncommon (Appendix 5-1, Section 4.3). Drill logs, by Petersen Hydraulic and Taylor Geo-Engineering, are in Appendix B of Appendix 5-1. Geotechnical data from the boreholes are in Appendices C-1 and C-2 of Appendix 5-1. Drilling and sample locations are shown on Drawing 5-39.

The Applicant has identified that, in and adjacent to the proposed permit area, ground-water resources in the Tropic Shale and Dakota Formation are limited, and neither is a significant source of ground water. Information supporting this conclusion is found in Section 721. Chapter 6 and Appendix 7-1 contain information on the lithology and stratigraphy of the Tropic and Dakota strata. Bore-hole logs in Appendix 6-4 indicate strata overlying and immediately underlying the Smirl Coal do not possess aquifer characteristics.

In the proposed permit and adjacent area, Tropic Shale and Dakota Formation provide no baseflow to streams or water from wells. The Applicant has identified one small spring (SP-4; average flow >1 gpm) and two seeps (SP-27 - also known as Clampett Spring - and SP-34) that flow from the Dakota Formation in the area just south of the proposed mine (Drawing 7-1). There are no wells in the proposed permit and adjacent area that produce water from the Tropic Shale or Dakota Formation. Mining of the Smirl Coal, at the Tropic – Dakota interface, is not expected to intercept significant volumes of water from these strata nor adversely impact any aquifer below the coal.

The Applicant states that the Dakota Formation is not a good aquifer. Vertical and horizontal ground-water flow in the Dakota Formation is impeded by the presence of low-permeability shales that encase the interbedded, lenticular sandstone strata in the formation, and the natural flow of ground water through the formation is meager, with only minor discharge from the Dakota to springs or streams in the surrounding area. The Tropic Shale that overlies the Dakota limits vertical recharge (Section 624.100; Groundwater).

Slug tests on wells screened in the Smirl Coal Seam indicate relatively low hydraulic conductivity values (Table 78). In much of the proposed mining area, the coal seam has been found to be dry. Neither large inflows of ground water from the coal seam into mine workings from the Dakota Formation nor seepage out of mine pits through the coal seam is expected.

The Division received a comment that the boreholes did not extend to the aquifers in the Dakota Formation. Borehole logs in Appendix 6-4 contains representative drill hole logs depicting the nature, depth and thickness of the coal seam to be mined, rider seams in the overlying strata and the nature of the Dakota Formation strata immediately below the coal seam to be mined, which meets the requirements of the Coal Mining Rules.

A comment was received that there is no description of the geology that includes any aquifer below the lowest coal seam to be mined, and that samples have not been collected from that aquifer. The Navajo Sandstone aquifer is a regional aquifer that provides ground water of good quality for domestic and agricultural use and to municipal wells. It provides baseflow to springs and streams, and it is the first water-bearing strata underlying the Smirl Coal Seam that can produce appreciable quantities of ground water. The Navajo Sandstone does not crop out in the proposed Coal Hollow Mine permit and adjacent area, is effectively isolated from proposed mining areas by more than 1,000 feet largely low-permeability shales and siltstones of Dakota and Carmel Formations, and is not reasonably expected to be impacted by proposed mining operations. The Navajo Sandstone is described in Sections 621, 624.100, 728.310.

The application contains geologic information in Chapter 6, Appendix 7-1, and other sections of the submittal. This information is not sufficient to assist in determining the PHC of the proposed operation on surface and ground waters in the proposed permit and adjacent areas, determining whether the required reclamation can be achieved, and whether the proposed operation has been designed to prevent material damage to the hydrologic balance in the adjacent area. The Sink Valley Fault and associated Tropic Shale ridge are important features in the surface and subsurface hydrology of Sink Valley Wash. The Permittee needs to show the extent and depth of the proposed pits on the geologic cross sections of Drawings 6-3, 6-7, and 6-8. Also, to more clearly convey the importance of the Sink Valley Fault and associated Tropic Shale ridge in the relationship of the hydrologic systems to the proposed mine, the Permittee needs to show the Sink Valley Fault on several other maps and cross sections, including but not limited to: Drawings 7-1, 7-4, 7-7, 7-12, 5-10, 5-17, 5-18, and 5-19. As an alternative, the Permittee could create new maps and cross sections that clearly show the relationship of the proposed pits to the Sink Valley Fault, the Tropic Shale Ridge, the alluvium, and the springs, wells, and surface water.

The PHC determination does not indicate the need for supplemental baseline information as described in R645-301-724.500. However, the Division will consider the need for supplemental information as public comments are received and the permitting process proceeds.

Baseline Cumulative Impact Area Information

The Division has not initiated the CHIA findings document. Information from the permit application will be used along with information from other sources in preparing the CHIA. The Applicant may be required to provide additional information.

Modeling

No modeling has been submitted or proposed for the Coal Hollow Mine permit application.

Probable Hydrologic Consequences Determination

Section 728 contains the PHC Determination, and there is also discussion in Section 724.500. A comment was received that the PHC determination was not based on baseline geologic and hydrologic information "collected for the permit application". The Division finds that there are deficiencies in some of the baseline data and therefore there are deficiencies in the Applicant's PHC determination. The following sections summarize the Applicant's PHC determination and deficiencies identified by the Division.

Potential Adverse Impacts to the Hydrologic Balance (728.310) The application states that information from drilling and aquifer tests indicates that large inflows to the mine pit are not expected; if such inflows develop as mining progresses, the Applicant commits to use techniques such as bentonite- or clay-filled cutoff walls to minimize inflows. Temporary reductions in flow from alluvial aquifers may occur but are likely to be short-lived as the pits will remain open for only 60 to 120 days.

Direct Interception of Ground-water Resources

The Applicant has identified that ground-water resources in the Tropic Shale and Dakota Formation are limited and neither the Tropic Shale nor Dakota Formation is a significant source of ground water. Information supporting this conclusion is found in Section 721. Chapter 6 and Appendix 7-1 contain information on the lithology and stratigraphy of the Tropic and Dakota strata. Bore-hole logs in Appendix 6-4 indicate strata overlying and immediately underlying the Smirl Coal do not possess aquifer characteristics. In the proposed permit and adjacent area, these strata provide no baseflow to streams or water from wells. The Applicant has identified one small spring (SP-4; average flow >1 gpm) and two seeps (SP-27 - also known as Clampett Spring - and SP-34) that flow from the Dakota Formation in the area just south of the proposed mine (Drawing 7-1). There are no wells in the proposed permit and adjacent area that produce

water from the Tropic Shale or Dakota Formation. Mining of the Smirl Coal, at the Tropic – Dakota interface, is not expected to intercept significant volumes of water from these strata nor adversely impact any aquifer below the coal.

A comment was received that there were no contour maps or cross sections depicting seasonal difference in head for aquifers in the Dakota Formation, that there are no water monitoring wells in the Dakota Formation, and that there is no description of the geology that includes any aquifer below the lowest coal seam to be mined. The Division sees no indication of an aquifer or other significant subsurface water resource in the Dakota strata, in and adjacent to the coal seam to be mined, that would warrant requiring the mentioned maps and cross sections or requiring the Applicant to install monitoring wells in the Dakota Formation.

The Navajo Sandstone aquifer is a regional aquifer that provides ground water of good quality for domestic and agricultural use and to municipal wells. It provides baseflow to springs and streams and the first water-bearing strata underlying the Smirl Coal Seam that can produce appreciable quantities of ground water. It is described in Sections 621, 624.100, 728.310).

Diminution of Downgradient Ground-water Resources

The Applicant has identified that neither the Tropic Shale nor Dakota Sandstone are a significant source of ground water. In the proposed permit and adjacent area, the Dakota Sandstone supports flow from one small spring and a few seeps that have no associated water rights.

Draining of Upgradient Ground-water Resources

Based on information from water monitoring wells, including slug tests and a pumping and recovery test of Y-61, and analysis of the geology and hydrology of the proposed permit and adjacent area, the Applicant has concluded that the proposed mine plan is designed to minimize potential diminution of flow from the alluvial springs in eth proposed permit and adjacent area.

The Applicant notes that after the pump Y-61 was stopped at the end of the 28-hour pumping test, spring discharge rates and water levels in alluvial monitoring wells recovered to approximate
pre-test levels: the data in Appendix 7-1 do not show this, rather indicating the measurements ending after only 30 hours for SP-20 and SP-14, 29 hours for C3-40, 28 hours for C2-40, and not even running to the end of the pumping period for SP-8, C4-30, and SS-30. The Applicant needs to provide the data for the complete recovery period, or at least include the next quarterly measurement to show the approximate extent of recovery.

The relationship of the alluvial ground-water table to wells and springs in and adjacent to the NW1/4 of Sec 29 is crucial in understanding the PHC of the proposed mining operation. Figure 18 in Appendix 7-1 indicates that during the pump teat on Y-61, water levels actually increased at SP-8 and flow increased at C2-40 and SS-30 after 4 hours of pumping (the location where the water was discharged is not described). A series of contour maps or cross section showing the progressive changes in the water table during the pump drawdown test would probably be very enlightening to both the Applicant and the Division.

If inflows to the mine pits become excessive as mining progresses, the Applicant commits to use techniques such as bentonite- or clay-filled cutoff walls to minimize inflows. Temporary reductions in flow from alluvial aquifers may occur but are likely to be short-lived as the pits will remain open for only 60 to 120 days.

Water replacement is discussed in Section 727. Long-term diminution of flow will be replaced with water from a well (Y-61 on maps in the application), located on land owned by Richard and Alecia Dame (Drawings 7-2 and 1-3); the Applicant states that the town of Alton has entered into an agreement to transfer the point of diversion for water rights to 50 acre-feet of water to be used to satisfy the Applicant's water replacement needs. The Applicant states that the access agreement with the Dames is verbal but that written agreement is forthcoming; a copy of the written agreement needs to be in the permit application before it can be approved. Also, a copy of the point-of-diversion transfer agreement with the town of Alton must be in the application. Without these two documents, there is no sound foundation for the Applicant's claim to be able to meet the water replacement requirements of the Coal Mining Rules.

Acid and Toxic-forming Materials (728.320)

Acid- or toxic-forming materials do not appear to be present in the proposed permit and adjacent area in amounts that create a concern. Appendix 6-2 contains information on the acid- and toxic-forming potential of earth materials naturally present in the proposed permit and adjacent areas. Appendix 6-1 (confidential binder) has information on the Smirl Coal Seam that is proposed for mining.

Sediment Yield from the Disturbed Area (728.331)

Sedimentation ponds, diversion ditches, and silt fences and other sediment control devices have been designed to minimize erosion from disturbed areas and control or prevent additional contributions of suspended solids to stream flow or runoff outside the permit area.

Impacts to Important Water-quality Parameters (728.332)

The Applicant does not anticipate discharge of waters from the Tropic Shale or Dakota sandstone. The plan calls for limiting inflow of alluvial waters into the pits, reducing the potential for contamination, mainly from increased TDS concentrations.

The Applicant anticipates that water will not be discharged from the mine pits, but data and analysis or discussion are not presented in support of this assertion. Alluvial water will be diverted away from the pits. The Applicant does not have a UPDES permit, but commits that any discharges from the mine will be done under a UPDES permit.

Geochemical data indicate the potential for AMD and toxic drainage is low: the Applicant needs to reference where these data and the Applicant's analysis and discussion of the data can be found.

Sedimentation ponds and other sediment control methods will minimize erosion from disturbed areas and control or prevent additional contributions of suspended solids to stream flow or runoff outside the permit area.

The Applicant commits to using spill control kits on all equipment to minimize contamination from spillage of hydrocarbons, and that the site will have a SPCC plan.

The Applicant states that where possible, ground water encountered in alluvial sediments along the margins of mine pit areas will be drained through pipes, ditches or other conveyance methods away from mining areas to prevent or minimize the potential for interaction with sediments disturbed by mining operations. There are no designs for these structures and no indication of where the water will go.

The Applicant states that as ground water migrates through the shallow, fine-grained alluvial sediments in the proposed Coal Hollow Mine permit and adjacent area (most notably in Sink Valley), the quality of the water are naturally degraded: Appendix 7-1 is referenced for this information. In the distal portions of Sink Valley, concentrations of magnesium, sulfate, and bicarbonate are most notably elevated in the alluvial ground water. The application needs a map or drawing that uses Stiff diagrams or some similar representation to show this degradation.

The application states that pumping and discharging of mine water from mine pits at the proposed Coal Hollow Mine permit area is not anticipated. The Applicant does not anticipate water entering the pit from adjacent strata, but this may prove to be incorrect. Flooding of pit mines by heavy precipitation is a known occurrence and a real possibility at the Coal Hollow Mine, as the Applicant states,

The anticipated discharge rates from alluvial groundwater drainage and the maximum reasonably foreseeable amount of mine discharge water that could potentially be required to be discharged from mine pits is much less than that periodically occurring during major torrential precipitation events.

The mine must have a plan for pumping and disposing of water from the pit.

Flooding or Streamflow Alteration (728.333)

The application states that rates at which alluvial ground water could drain into the mine pits will likely not be sufficient to potentially cause flooding or stream flow alteration in either Sink Valley Wash or Lower Robinson Creek drainages. The potential alluvial ground water inflow is not quantified, nor is there any discussion supporting to the conclusion that discharge of the drainage will not sufficient to cause flooding or streamflow alteration.

Where are the data and analyses that support the statement (p. 7-34) that anticipated discharge from the alluvial drainage into the pits and the reasonably foreseeable amount of water to be discharged from the mine pits is much less that that from periodic rainstorms?

The Applicant finds it noteworthy that the principle surface drainages in and adjacent to the proposed Coal Hollow Mine permit area, i.e., Lower Robinson and Kanab Creeks and their tributaries, are in many locations not stable in their configurations. The application gives land management practices in the late 1800s or early 1900s as the reason for this instability; the application does not give the source of this supposition nor discuss the impact of the proposed Coal Hollow Mine on this instability.

The Applicant states that Sink Valley Wash has a large discharge capacity and conveys large volumes of runoff periodically, yet the Applicant asserts elsewhere that this is not a continuous channel. The Applicant needs to clarify and rectify this apparent incongruity.

The application states in Section 728.333 that most precipitation waters falling on disturbed areas will be contained in diversion ditches and routed to sediment impoundments that are designed to impound seasonal water and storms. (Does "most" refer to 51% or 99% of the precipitation? Where are the data and analyses to quantify this statement?)

In the proposed mining plan, Lower Robinson Creek is to be diverted permanently. Appendix A5-2 details the analysis and specifications and Drawings 5-20 and 5-21 show the design details. The resulting channel will have straight reaches and three sharp bends - including two 90° bends - and will require extensive rip-rap. The application does not contain a justification for such an unnatural and potentially unstable configuration, which does not restore or approximate the premining characteristics of the original stream channel or return the site to AOC (acknowledging that the "premining" channel is deeply incised and actively eroding

headward). Unless the Applicant can present a compelling argument that the proposed plan is superior for stability and longevity, the Division will press for final reclamation to be a sinuous channel configuration, near the current channel location, that will not require heavy use of rip rap and which will more closely match the characteristics of the natural, original (premining but also pre incision and head-cutting) stream channel and AOC. Such a configuration can produce a flatter flow gradient and stable slope angles and support vegetated slopes - the same positive channel attributes the Applicant seeks with their more radical design.

Ground Water and Surface Water Availability (728.334)

The application states (Sec 728.334) that irrigation has not occurred during the past 10 years, but provides no basis for this statement.

The application states that potential decreases in alluvial discharge in Area A are anticipated to be short lived. There is no quantification or discussion of this assertion. What would be the worst case scenario, and how would the mine deal with it?

The application states that water replacement is to be from well Y-61. The pump test at Y-61 is discussed in Section 9.3 of Appendix 7-1. The Applicant notes that after the pump on Y-61 was stopped at the end of the 28-hour pumping test, spring discharge rates and water levels in alluvial monitoring wells recovered to approximate pre-test levels: the data in Appendix 7-1 do not show this, the measurements ending after only 30 hours for SP-20 and SP-14, 29 hours for C3-40, 28 hours for C2-40, and not even running to the end of the pumping period for SP-8, C4-30, and SS-30. The Applicant needs to provide the data for the complete recovery period, or at least include the next quarterly measurement to show the approximate extent of recovery.

The limited information in the application does not demonstrate that Y-61 can produce sufficient water to provide for long-term water replacement; the information indicates the well can pump up to 50 acre-feet per year, the amount allowed by the pending point-of-diversion transfer, but is the worst case scenario more or less than 50 acre-feet? Statements in Section 729.310 indicate nearby springs and wells were affected but did not appear to suffer long-term impacts from the 28-hour pump test in Y-61, but the question remains as to what pumping at the maximum rate for a prolonged period would do to the alluvial aquifer, springs, and wells.

Sink Valley Wash and Lower Robinson Creek drainages supply surface water that is available for use in the proposed permit and adjacent area. Runoff from the adjacent Paunsaugunt Plateau is the main source of water.

The Applicant concludes that there is essentially no probability that surface water in the Sink Valley Wash drainage could become unavailable as a result of the proposed mining and reclamation activities: the surface waters originate from up-gradient areas that are located large distances from the proposed mining, and the stream channels are entirely outside the area to be

disturbed by mining and reclamation activities. The application states that in the Sink Valley Wash drainage, surface-water flows in Water Canyon and Swapp Hollow are used for stock watering and limited irrigation: Drawing 7-3 shows there are water rights for surface point-of-diversion and point-to-point diversions along Sink Valley Wash but none in the two mentioned tributary drainages (monitoring at point SW-8 in Swapp Hollow has consistently noted flow in this channel). The application also states that below Section 29 T. 39 S., R. 5 W., Sink Valley Wash usually has no appreciable discharge: there are point-to-point and surface point-of-diversion water rights in Sink Valley Wash below Section 29 (Drawing 7-3).

Drawing 7-2 shows the only surface-water monitoring point in the main channel of Sink Valley Wash is SW-9 in Section 6, T. 40 S., R. 5 W., approximately 2 miles south of the proposed permit area; SW-6 is on a small tributary branch that drains the southernmost portion proposed permit area. Baseline data show flows at these locations have been ephemeral and episodic. On March 22, 2008, flow was 1,370 gpm at SW-6 but there was no flow at SW-9 (SW-8 in Swapp Hollow was inaccessible).

The application indicates Lower Robinson Creek immediately above the proposed permit area typically discharges only in direct response to precipitation or snowmelt, so surface-water availability is limited. Ground water seeps from the alluvium into the deeply incised stream channel near the exposed Dakota-alluvium contact in the bottom of the stream channel, in the SE¼, Section 19, T. 39 S., R. 5 W. (the Applicant considers it noteworthy that the location of this discharge has varied somewhat over time, but offers no further comment). This seepage, monitored at SW-5 (Drawing 7-2), is characterized as usually 5 - 10 gpm or less: significantly larger flows, as great as 410 gpm, have been reported at this site (Division's database), although such large flows are presumed to be runoff – the database does not distinguish seepage from runoff.

Surface-Water Monitoring Plan

The protocol for baseline and operational surface-water monitoring is in Tables 7-4 through 7-6B. Drawing 7-2 shows baseline monitoring locations. Section 724.200 discusses baseline surface-water monitoring; three paragraphs at the end of Section 724.200 describe baseline surface-water monitoring sites. Discrepancies between Section 724.200, Drawing 7-2, and Table 7-5, shown in the following table, need to be resolved.

Baseline Monitoring Sites	Described in Section 724.200	Listed in Table 7-5	Shown on Drawing 7-2	Data in Database
SW-1	√		√	√
SW-2	√	√	√	√
SW-3	√	√	√	√

SW-4	√	√	√	√
SW-5	√	√	√	√
SW-6	√	√	√	√
SW-7	√		√	√
SW-8	√	√	√	√
SW-9	√	√	√	√
SW-10			√	√
SW-18			√	
SW-101	√	√	√	√
BLM-1		√	√	√
RID-1	√	√	√	√
Lamb Canal			√	√

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The Applicant will apply for a UPDES permit to discharge from the mine pit, to either Lower Robinson Creek or Sink Valley Wash, which are both tributary to Kanab Creek.

Findings:

R645-301-624, -724, The Permittee needs to show the extent and depth of the proposed pits on the geologic cross sections of Drawings 6-3, 6-7, and 6-8. Also, to more clearly convey the importance of the Sink Valley Fault and associated Tropic Shale ridge in the relationship of the hydrologic systems to the proposed mine, the Permittee needs to show the Sink Valley Fault on several other maps and cross sections, including but not limited to: Drawings 7-1, 7-4, 7-7, 7-12, 5-10, 5-17, 5-18, and 5-19. As an alternative, the Permittee could create new maps and cross sections that clearly show the relationship of the proposed pits to the Sink Valley Fault, the Tropic Shale Ridge, the alluvium, and the springs, wells, and surface water.

R645-301-724.100, The area covered by the seep and spring survey in Appendix 7-1 needs to be shown on a map or otherwise clearly identified.

R645-301-722.300, The Applicant needs to clarify the difference between the bore holes shown on Drawing 7-2 and those on Drawing 7-12 and why some are considered sources for baseline information while others are not.

- This need for clarification also applies to the narrative for this section and Section 724.100.
- The difference between the bore holes and wells in Tables 7-1 and 7-2 needs to be clarified.

R645-301-728.332, -121.200, The Applicant needs to identify where in the application the following can be found (in reference to the PHC):

- geochemical data that indicate the potential for AMD and toxic drainage is low, and
- an analysis or discussion of the data.

R645-301-728.332, The Applicant anticipates that water will not be discharged from the mine pits, but data and analysis or discussion in support of this assertion must be included in the application.

R645-301-728.333, The application states that rates at which alluvial ground water could drain into the mine pits will likely not be sufficient to potentially cause flooding or stream flow alteration if discharged to either Sink Valley Wash or Lower Robinson Creek drainages. The Applicant needs to quantify the potential alluvial ground water inflow and present some analysis in support of the conclusion.

R645-301-728.333, The Applicant needs to provide data and analyses that support the statement (p. 7-34) that anticipated discharge from the alluvial drainage into the pits and the reasonably foreseeable amount of water to be discharged from the mine pits is much less that that from periodic rainstorms.

R645-301-722.400, The Applicant must distinguish water wells from other wells and boreholes on Drawings 7-2 and 7-12.

R645-301-727, The application must include a copy of the written agreement with Richard and Alecia Dame that allows access to well Y-61 on the Dames property;

- The application must include a copy of the written agreement with the town of Alton to transfer the point of diversion for 50 acre-feet of water for the Applicant's use to Y-61.

R645-301-121.200, The application states in Section 727 that well Y-61 has a borehole diameter of 8.625 feet; this must be corrected.

R645-301-121.200, The Applicant states that as ground water migrates through the shallow, fine-grained alluvial sediments in the proposed Coal Hollow Mine permit and adjacent area (most notably in Sink Valley), the quality of the water are naturally degraded: Appendix 7-1 is referenced for this information. The application needs a map or drawing that uses Stiff diagrams or some similar representation that will clearly show this degradation.

R645-301-121.200, -750, The Applicant needs to clarify where ground water encountered in alluvial sediments along the margins of mine pit areas will be drained to.

- There must be at least some nominal design and performance specifications for the pipes, ditches or other conveyance methods that will carry these waters away from mining areas.

R645-301-728.333, Flooding of pit mines by heavy precipitation is a known occurrence at open cast mines and a real possibility at the Coal Hollow Mine. The mine does not anticipate water entering the pit from adjacent strata, but this may prove to be incorrect. The mine needs a plan for pumping and disposing of water from the pit.

R645-301-728.333, The application needs to quantify the rate - at a minimum provide a reasonable worst-case estimate - at which alluvial ground water could drain into the mine pits: whether or not removing such water from the pit can potentially cause flooding or stream flow alteration has not been and cannot be analyzed without such information.

R645-301-728.333, The Applicant needs to provide a basis for the supposition that land management practices in the late 1800s or early 1900s are the reason for the instability of the principle surface drainages in and adjacent to the proposed mine area. The application needs to discuss the potential impact of the Coal Hollow Mine on this instability.

R645-301-728.333, The Applicant states in Section 728.333 that lower Sink Valley Wash has a large discharge capacity and conveys large volumes of runoff periodically, yet the Applicant asserts in the AVF section that Sink Valley Wash is not a continuous channel. The Applicant needs to clarify and rectify this apparent incongruity.

R645-301-121.200, -728.333, The application needs to quantify the statement in Section 728.333 that most precipitation waters falling on disturbed areas will be contained in diversion ditches and routed to sediment impoundments that are designed to impound seasonal water and storms. How much water will not be contained in these structures, and what happens to water not entering diversions and ponds?

R645-301-728.333, The application states (Sec 728.334) that irrigation has not occurred during the past 10 years: the Applicant needs to provide a basis for this statement.

R645-301-728.334, The application needs to quantify the potential decreases in alluvial discharge in Area A (that are anticipated to be short lived). There is no quantification or discussion of the assertion. What would be the worst case scenario, and how would the mine deal with it?

R645-301-553.110, -742.312.1, - 742.313, - 742.314, The Division sees no purpose or need for the unnatural and potentially unstable proposed final permanent configuration of Lower Robinson Creek, which furthermore does not appear to meet AOC requirements. The Applicant must provide a plan to reclaim Lower Robinson Creek to a more natural and stable configuration, which restores or approximates the premining characteristics of the original stream channel and AOC for the area. Increasing sinuosity above that of the pre-mining channel in order to reduce the channel gradient should be considered.

R645-301-724.500, The Applicant notes that after the pump on Y-61 was stopped at the end of the 28-hour pumping test, spring discharge rates and water levels in alluvial monitoring wells recovered to approximate pre-test levels: the data in Appendix 7-1 do not show this, the measurements ending after only 30 hours for SP-20 and SP-14, 29 hours for C3-40, 28 hours for C2-40, and not even running to the end of the pumping period for SP-8, C4-30, and SS-30. The Applicant needs to provide the data for the complete recovery period, or at least include the next quarterly measurement to show the approximate extent of recovery.

R645-301-722.100, The relationship of the alluvial ground-water table to wells and springs in and adjacent to the NW1/4 of Sec 29 is crucial in understanding the PHC of the proposed mining operation. The Applicant must include a series of contour maps or cross section showing the progressive changes in the water table during the Y-61 pump drawdown test.

R645-301-121.200, -724.200, The surface-water baseline discrepancies between Section 724.200, Drawing 7-2, Table 7-5, and the Division's database, as outlined in the following table, need to be resolved.

Baseline Monitoring Sites	Described in Section 724.200	Listed in Table 7-5	Shown on Drawing 7-2	Data in Database
SW-1	√		√	√
SW-7	√		√	√
SW-10			√	√
SW-18			√	
BLM-1		√	√	√
Lamb Canal			√	√

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Subsurface Water Resource Maps

Ground-water resources consist of both springs and wells. Artesian conditions have been documented in several wells, and some have sufficient head to flow. Drawing 7-13 shows the potentiometric or water-table elevations of the alluvial ground-water system. This is somewhat deceptive because it does not relate ground water to the surface topography, i.e., it gives the impression of a fairly uniform subsurface water table, when the data show springs and seeps, flowing wells, and areas of confined and unconfined conditions, and two areas where ground water flows to the surface, perhaps indicating at least two distinct alluvial ground-water systems exist in the alluvium. Cross sections on Figures 6b through 6g in the Alluvial Valley Floor Supplemental Information in Chapter 7 show variation between June and November -December 2007. No map depicts seasonal variation of head in the aquifer(s). The Applicant needs to provide maps depicting:

1. the relationship of water table(s) and potentiometric surface(s) to ground-surface elevations, and
2. seasonal variations in head in the various aquifers.

Surface Water Resource Maps

The locations of streams, stock watering ponds, and conveyance ditches in the proposed Coal Hollow Mine permit and adjacent area are shown on Drawing 7-7.

Findings:

R645-301-722.100, The Applicant needs to provide:

1. maps and cross sections depicting the relationship of water table(s) and potentiometric surface(s) to ground-surface elevations, and
2. maps showing seasonal variations in head in the various aquifers.

OPERATION PLAN

The Division received a comment that the Operation Plan is not specific to local hydrologic conditions nor does it address potentially adverse hydrologic consequences because the PHC is not complete. As discussed in this and other Tech Reviews, there are deficiencies in the baseline data and in the PHC that need to be addressed, but these deficiencies are not fatal flaws that have precluded the Applicant from formulating an Operation Plan. The Operation Plan submitted by the Applicant is based on valid baseline data and a reasonable draft PHC determination. All three elements are subject to revision as the deficiencies are addressed by the Applicant

SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

Analysis:

Coal Mine Waste

The Applicant does not plan on disposing of coal mine waste in the excess spoil pile (521.143).

Refuse Piles

No refuse pile is planned for the Coal Hollow Mine (513.400).

Impounding Structures

Section 514.310 - 313 states that a professional engineer or specialist experienced in the construction of impoundments will inspect impoundments during construction, upon completion of construction, and at least yearly until removal of the structure or release of the performance bond; and will provide the Division certified reports on the construction and maintenance. A copy of the reports will be retained at or near the mine site.

The Applicant commits in Section 515.200 that any potential hazards identified by inspections will promptly be reported to DOGM, along with emergency procedures for public protection and remedial action.

The Applicant does not contemplate construction of any permanent water impoundments; coal processing waste banks and coal processing waste dams or embankments (521.125). The Applicant does not contemplate construction of any impoundments meeting the RCS Class B or C criteria for dams in TR-60, or the size or other criteria of 30 CFR Sec. 77.216. 521.125. Ponds and Other Impoundments.

Return of Coal Processing Waste to Abandoned Underground Workings

There will be no underground workings at the proposed Coal Hollow Mine.

Excess Spoil:

Drawing 5-3 and 5-35 show the areas where excess spoil will be placed. Drawings 5-35 and 5-36 show the design of the fill. Appendix 5-1 is a geotechnical analysis of the sediment impoundments and excess spoil structure prepared by Taylor Geo-Engineering, LLC. The Applicant does not plan on disposing of coal mine waste in the excess spoil pile (521.143).

The refuse pile is designed to minimize effects on surface and ground water due to leaching and surface water runoff: design details are in Section 535 (745.100). A spring and seep survey identified no springs or wet weather seeps in the proposed excess spoil area. The final surface will be regraded to a contour that will route water from snowmelt and rainfall around the excess spoil (Drawing 5-35). No manmade water courses are present in the excess spoil area. No underdrains are planned for the excess spoil structure (745.100).

Findings:

The application meets the requirements of this section of the Coal Mining Rules.

MINE OPENINGS

Regulatory Reference: 30 CFR Sec. 817.13, 817.14, 817.15; R645-301-513, -301-529, -301-551, -301-631, -301-748, -301-765, -301-748.

Analysis:

The following commitments are made in Sections 513.200, 529, 541, 542.700, and 755. These plans and commitments meet the requirements of the Coal Mining Rules for Mine Openings, including exploration bore holes, water wells, and monitoring wells:

- Wells constructed for monitoring ground water conditions in the proposed Coal Hollow Mine permit and adjacent area, including exploration holes and boreholes used for water wells or monitoring wells, will be designed to prevent contamination of ground- and surface-water resources and to protect the hydrologic balance.
- All wells will be managed to comply with R645-301-748 and R645-301-765. Water monitoring wells will be managed on a temporary basis according to R645-301-738.
- If any exploration boreholes are to be used as monitoring wells or water wells, these will meet the provisions of R645-301-731.
- Exploration holes and boreholes will be backfilled, plugged, cased, capped, sealed, or otherwise managed to prevent acid or toxic contamination of water resources and to minimize disturbance to the prevailing hydrologic balance. Exploration holes and boreholes will be managed to ensure the safety of people, livestock, fish and wildlife, and machinery.
- A diagram depicting typical monitoring well construction methods is shown in Figure 7-11. A steel surface protector with a locking cover will be installed at monitoring wells to prevent access by unauthorized personnel. Where there is potential for damage to monitoring wells, they will be protected through the use of barricades, fences, or other protective devices. These protective devices will be periodically inspected and maintained in good operating conditions. Monitoring wells will be locked in a closed position between uses.
- When no longer needed for monitoring or other use approved by the Division upon a finding of no adverse environmental or health and safety effects, or unless approved for transfer as a water well under R645-301-731.100 through R645-301-731.522 and R645-301-731.800, each well will be capped, sealed, backfilled, or otherwise properly managed, as required by the Division in accordance with R645-301-529.400, R645-301-631.100, and R645-301-748. Permanent closure measures will be designed to prevent access to the mine workings by people, livestock, fish and wildlife, machinery and to keep acid or other toxic drainage from entering ground or surface waters.
- Any water well exposed by coal mining and reclamation operations will be permanently closed unless otherwise managed in a manner approved by the Division.
- Wells constructed for monitoring ground-water conditions in the proposed Coal Hollow Mine permit and adjacent area, including exploration holes and boreholes used for water wells or monitoring wells, will be designed to prevent contamination of ground water and surface-water resources and to protect the hydrologic balance. A diagram depicting typical monitoring well construction methods is shown in Figure 7-11.

Section 513.200 outlines the procedure that will be used for abandonment and closure of wells. The plans are clear for the method to close wells deeper than 30 feet, but unclear on closure of shallower wells. The application needs a closure plan that clearly includes all wells and bore holes.

Although there are currently no plans for underground mining, the Applicant commits in Section 513.500 to cap, seal, backfill or otherwise properly manage each shaft, drift, adit, tunnel, exploration hole, entryway, other exposed underground opening, or other opening to the surface from the underground consistent with MSHA 30 CFR 75.1711. Permanent closure measures will be designed to prevent access to the mine workings by people, livestock, fish and wildlife, machinery and to keep acid or other toxic drainage from entering ground or surface waters.

Findings:

R645-301-748, -755, -765, The plans are clear for the method to close wells deeper than 30 feet, but unclear on closure of shallower wells. The application needs a closure plan that clearly includes all wells and bore holes.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

General

The Applicant commits to replace the water supply of an owner of interest in real property who obtains all or part of their supply of water for domestic, agricultural, industrial, or other legitimate use from the underground or surface source, where the water supply has been adversely impacted by contamination, diminution, or interruption proximately resulting from the surface mining activities. Baseline hydrologic information required in R645-301-624.1 00 through R645-30 1-624.200, R645301- 625, R645-301-626, R645-301-723 through R645-301-724.300, R645-301-724.500, R645-301-725 through R645-301-731, and R645-301-731.210 through R645-301731.223 will be used to determine the extent of the impact of mining upon ground water and surface water (Section 731.800).

The eastern edge of the pits will intercept alluvial aquifers that support numerous springs, wells, and subirrigated lands. There is probably going to be drainage from these aquifers into the pits. When mining is done in each pit, it is to be filled and reclaimed. Porous fill material must not be left adjacent to the alluvial aquifers as that would facilitate continuous drainage from the aquifers into the fill in the pits. The Applicant must provide a design for the margin, where the pits meet the undisturbed alluvium, that specifies methods to be used to minimize drainage from the alluvium into the fill. A grout curtain or geomembrane would be possible methods of

blocking ground-water flow across this boundary, but the Applicant may devise other methods to achieve this purpose.

Surface Water Monitoring

Drawing 7-1 shows locations for streams in and adjacent to the proposed permit and adjacent area; Drawing 7-7 shows locations for a number of small ponds created to impound runoff and spring discharge for stockwatering and irrigation, and conveyance ditches. The drawing base for both drawings, the Alton USGS Topographic Quad, shows numerous small ponds that generally coincide with the ponds marked by the Applicant on Drawing 7-7, although the Applicant has identified ponds that are not shown on the basemap. Section 722.200 states there are no significant natural ponds or lakes.

The surface water monitoring plan is summarized in Tables 7-4 through 7-7b.

The Division received a comment that the water monitoring plan was not complete because baseline information was not complete. As has already been discussed, there are some deficiencies in the baseline data that need to be rectified, but on the whole the baseline data provide sufficient understanding of the hydrology of the proposed permit and adjacent area to prepare a surface-water monitoring plan.

Acid- and Toxic-Forming Materials and Underground Development Waste

Appendix 6-2 contains information on the acid- and toxic-forming potential of earth materials naturally present in the proposed permit and adjacent areas. Appendix 6-1 (confidential binder) has information on the Smirl Coal Seam, which is proposed for mining.

The Division received a comment that there were no analyses identifying strata that might contain acid- and toxic forming materials from the Dakota Formation (R645-301-624.220). The data referred to in the preceding paragraph meet this requirement.

Transfer of Wells

The Applicant commits in Sections 738, 748, 755, and 765 that, when no longer needed for monitoring or other use approved by the Division upon a finding of no adverse environmental or health and safety effects, or unless approved for transfer as a water well under the Coal Mining Rules, each well will be capped, sealed, backfilled, or otherwise properly managed, as required by the Division in accordance with the Coal Mining Rules.

Water-Quality Standards and Effluent Limitations

The Applicant has committed to apply for a UPDES permit (Section 728.332) to discharge from the mine pit, to either Lower Robinson Creek or Sink Valley Wash, which are both tributary to Kanab Creek. Supplemental containment and sedimentation ponds will be built if needed to meet effluent discharge standards (Section 724.500).

Diversions: General

Drawing 5-3 shows the proposed locations for the sedimentation ponds, ditches, and other sediment control measures. Drawing 5-25 shows the location of diversion ditches and sedimentation ponds. Drawing 5-27 shows the drainages reporting to the sediment control diversion ditches. Details of sediment control diversion ditch construction are on Drawings 5-33 and 5-34.

Diversions: Perennial and Intermittent Streams

Drawings 5-20 and 5-21 show plans for the Robinson Creek diversion. This is planned to be a permanent diversion. See previous comments on the inappropriateness of this as a permanent diversion

Diversions: Miscellaneous Flows

Diversion of miscellaneous flows is planned using four diversion ditches. Two will be primarily used to route runoff from upland, undisturbed areas away from the planned disturbed areas, and the other two are planned to direct runoff from disturbed areas into sediment impoundments. Drawings 5-25, 5-27, 5-33 and 5-34 show the locations of these diversions, along with the associated watersheds. Appendix 7-2 contains the calculations related to these diversions.

Stream Buffer Zones

The application commits that any perennial or intermittent streams in the mine area will be protected by 100 foot stream buffer zones on either side. Areas surrounding the streams that are not to be disturbed will be designated as buffer zones, and will be marked as specified in R645-301-521.260.

In order to allow any proposed operations inside a stream buffer zone, the Division will need to make a finding that coal mining and reclamation operations will not cause or contribute to the violation of applicable Utah or federal water standards and will not adversely affect the water quality and quantity or other environmental resources of the stream: the Division has not made such a determination at this time. As currently proposed, the plan calls for the permanent diversion of a reach of the Lower Robinson Creek stream channel, approximately 2,000 feet in length, in the southeast 1/4 of Section 19, T. 39 S., R. 5 W. Details of the proposed diversion are given in Chapter 5, Section 527.220 of this MRP. The Division does not see the need or purpose to make such an unnatural and unstable relocation of this channel permanent: see previous comments

Sediment Control Measures

The Applicant states that sediment control measures have been designed, constructed and maintained to prevent additional contributions of sediment to stream flow or to runoff outside the permit area (Section 732). The Applicant proposes four diversion ditches and four sediment impoundments for the proposed permit area. Specific areas will be treated by additional miscellaneous controls such as silt fence and berms. The proposed locations for these structures are shown on Drawing 5-3. Details associated with these structures can be viewed on Drawings 5-25 through 5-34 and Appendix 5-2.

The Applicant proposes cut ditches on the shoulders of all primary roads to control drainage and erosion. Cut and fill slopes along the primary roads will be minimal and are not expected to cause significant erosion. In locations where there are culvert crossings (i.e. Lower Robinson Creek), the fill slopes will be stabilized by utilizing standard methods such as grass matting or straw wattles. The location and details for roads can be viewed on Drawings 5-3 and 5-22 through 5-24.

Sediment control measures are to be located, maintained, constructed and reclaimed according to plans and designs given under R645-301-732, R645-301-742 and R645-301-760 in the application. Siltation structures and diversions will be located, maintained, constructed and reclaimed according to plans and designs given under R645-301-732, R645-301-742 and R645-301-763 (Section 731).

Storm water and snow melt within the facilities area is to be routed to a sedimentation pond. This pond is to have a drop-pipe spillway installed to allow removal of oil sheens by using absorbent materials. Drawing 5-28 shows the details for this impoundment (Section 731).

Siltation Structures: Sedimentation Ponds

Drawing 5-3 shows the planned location of each sedimentation pond. Particulate matter will be allowed to settle prior to the discharging of the water to the receiving water, controlling suspended solids concentrations (728.322). Appendix 5-2 contains sizing calculations for the sedimentation ponds; Appendix 5-3 contains sizing calculations for culverts, and both Appendices 5-2 and 5-3 include sizing data for diversions. Sediment control facilities will be designed and constructed to be geotechnically stable (728.333).

Drawing 5-25 shows the location of sedimentation ponds, and Drawing 5-26 shows the drainages reporting to the sedimentation ponds. Drawings 5-28 to 5-31 show designs for construction of the sedimentation ponds. Drawings 5-32 shows design details for the spillways.

The planned sedimentation ponds small enough that they do not need to meet the requirements of MSHA, 30 CFR 77.216(a). The Applicant commits that should any impoundments and sedimentation ponds that meet the size or other qualifying criteria of MSHA, 30 CFR 77.216(a) be built, the ponds will meet those criteria.

Siltation Structures: Other Treatment Facilities

No Other Treatment Facilities are planned for the Coal Hollow Mine.

Siltation Structures: Exemptions

No exemptions are requested for the Coal Hollow Mine.

Discharge Structures

Each impoundment will be constructed with a spillway that will function as both the emergency and principle spillway. Each of these spillways will safely discharge a 25-year, 6-hour precipitation event. Impoundments 1 and 2 will be constructed with a drop-pipe spillway system. Impoundments 3 and 4 will be constructed with open channel spillways designed to discharge a 24-hour duration, 100-year storm event. They will be vegetated to minimize erosion. Drawing 5-28 through 5-32 provides the details for these structures.

Impoundments

The sedimentation ponds are the only planned impoundments. None of the impoundments meet the MSHA criteria of 30 CFR 77.216(a) (Section 743.110).

Ponds, Impoundments, Banks, Dams, and Embankments

Section 733 states that a professional engineer experienced in the design and construction of impoundments, with assistance from a geotechnical expert, has used current, prudent engineering practices to design the proposed impoundments. The plans have been certified and a detailed geotechnical analysis has been provided in Appendix 5-1. The certifications, drawings and cross sections can be viewed in Drawings 5-25 through 5-31 and Appendices 5-1 and 5-2. The 3-foot freeboard designed for the impoundments should be sufficient to prevent overtopping from waves and storm events. Section 743 states that these impoundments do no meet the criteria for Class B or C dams or MSHA CFR 77.216 (a)

Findings:

(Repeat) R645-301-553.110, -742.312.1, -742.313, -742.314, The Division sees no purpose or need for the unnatural and potentially unstable proposed final permanent configuration of Lower Robinson Creek, which furthermore does not meet AOC requirements. The Applicant must provide a plan to reclaim Lower Robinson Creek to a more natural and stable configuration, which restores or approximates the premining characteristics of the original stream channel and AOC for the area. Increasing sinuosity above that of the current channel in order to reduce the channel gradient might be considered.

R645-301-731, The Applicant must provide a design for the margin where the pits meet the undisturbed alluvium that specifies methods to be used to minimize drainage from the alluvium into the fill in the reclaimed pits.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-512, -301-521, -301-542, -301-632, -301-731, -302-323.

Analysis:

Affected Area Maps

Drawing 7-1 shows locations for seeps and springs. There are no seeps or springs in the excess spoil area (Section 535.100).

Mining Facilities Maps

Drawing 5-3 shows the planned location of each sedimentation pond.

Monitoring and Sampling Location Maps

Drawing 7-10 shows the surface-water monitoring locations.

Findings:

Mining Operation s maps are sufficient to meet this section of the Coal Mining Rules.

RECLAMATION PLAN

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Hydrologic Reclamation Plan

The application commits that all impoundments will be reclaimed at the end of operations, and that all sedimentation control structures, including ditches, berms, and sedimentation ponds not retained as part of the approved post-mining land use will be removed, the areas regraded, topsoiled, and revegetated (524.100-600). Drawing 5-38 shows the estimated timeline for removal of these structures. Expected removal is year four of the mining and reclamation process. In areas where soils are not stabilized following the removal of these sediment impoundments, silt fence will be appropriately installed and maintained to provide sediment control until stable conditions are met (Section 763.100).

When no longer needed for monitoring or other use approved by the Division (unless approved for transfer as a water well) each well will be capped, sealed, backfilled, or otherwise properly managed. Permanent closure measures outlined in Sections 542.700 and 551 are designed to prevent access to the mine workings by people, livestock, fish and wildlife, machinery and to keep acid or other toxic drainage from entering ground or surface waters. Water wells exposed by coal mining and reclamation operations will be permanently closed, unless otherwise managed in a manner approved by the Division. Exploration holes and boreholes will be backfilled, plugged, cased, capped, sealed, or otherwise managed to prevent acid or toxic contamination of water resources and to minimize disturbance to the prevailing hydrologic balance (542.700).

Findings:

The Hydrologic Reclamation Plan meets the requirements of the Utha Coal Mining Rules.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

Analysis:

Reclamation Monitoring and Sampling Location Maps

The application states that ground- and surface-water monitoring will continue through the post-mining periods until bond release. The monitoring requirements, including monitoring sites, analytical parameters and the sampling frequency may be modified in the future in consultation with the Division if the data demonstrate that such a modification is warranted (Section 731.200).

Findings:

The information in the application meets the requirements of the Coal Mining Rules.

BONDING AND INSURANCE REQUIREMENTS

Regulatory Reference: 30 CFR Sec. 800; R645-301-800, et seq.

Analysis:

Terms and Conditions for Liability Insurance

The ACORD Form in Appendix 1-4 shows the liability insurance expired 5/19/2008.

Findings:

R645-301-117.100 The Applicant needs to provide either a certificate of liability insurance or evidence of self-insurance in compliance with R645-301-800.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

Analysis:

The Division will provide a CHIA.

Findings:

The Division will provide a CHIA.

RECOMMENDATIONS:

The application cannot be approved until the deficiencies identifies in this Tech Memo have been addressed satisfactorily.

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